

**Notice of Allowability**

Application No.

09/928,004

Examiner

Tamara Teslovich

Applicant(s)

WEARE, CHRISTOPHER BRUCE

Art Unit

2137

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to Application filed 10 August 2001.
2. ☒ The allowed claim(s) is/are 1 and 3-25.
3. ☒ The drawings filed on 10 August 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All b) ☐ Some\* c) ☐ None of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
  6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
    - (a) ☐ including changes required by the Notice of Draftperson's Patent Drawing Review (PTO-948) attached
      - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
    - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08),  
Paper No./Mail Date 12.10.01
4. ☐ Examiner's Comment Regarding Requirement for Deposit  
of Biological Material

5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413),  
Paper No./Mail Date 05.25.05
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other \_\_\_\_\_



**ANDREW CALDWELL  
SUPERVISORY PATENT EXAMINER**

## **DETAILED ACTION**

### **ELECTION / RESTRICTION**

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-25, drawn to the detection of particular sequences of bits within larger sequences of bits, classified in class 708, subclass 200. Within subclass 200, subclasses 212, 404, and 405 are particularly relevant for dependent claims.
- II. Claims 26-30, drawn to digital signal processing wherein the psycho-acoustic spectral coefficients of the signal are calculated and used to make a comparison between two signals, classified in class 704, subclass 200.1.

Inventions I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention II has separate utility such as a psychoacoustic signal processing system. See MPEP § 806.05(d).

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Attorney Thomas Watson on May 20, 2005 a provisional election was made without traverse to prosecute the invention of I, claims 1-25. Claims 26-30 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

### **EXAMINER'S AMENDMENT**

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Thomas Watson on May 25, 2005.

The application has been amended as follows:

Please amend Claims in accordance with Examiner's "Amendment to the Claims" included as pages 4-9 of this office action.

Please amend Specification in accordance with Examiner's "Amendment to the Specification" included as page 10 of this office action.

Please amend Abstract in accordance with Examiner's "Amendment to the Abstract" included as page 11 of this office action.

**AMENDMENT TO THE CLAIMS**

1. (Currently Amended) A method to create a fingerprint for media entities, comprising:

reading data indicative of a media entity desiring at least one fingerprint, said media entity data containing a sequence of random bits having a length N; and

processing said media entity data in accordance with at least one fingerprinting algorithm, said fingerprinting algorithm employing bit-to-bit comparisons and at least one approximation technique to process fingerprints, wherein said processing further comprises:

calculating the average information density of said media entities;

determining the standard deviation of the calculated information of said media entities;

calculating the average critical band energy of the said media entities;

calculating the average standard deviation of the critical band energy of said media entities;

determining the play-time of said media entities; and

processing said information density, said standard deviation of said information density, said critical band energy, said standard deviation of said critical band, and said play time to produce a bit-sequence representative of said fingerprint.

2. (Canceled).

3. (Currently Amended) The method as recited in claim 1 [[2]], further comprising the step of comparing said bit sequence of said created fingerprint with said bit sequence of said data indicative of said media entities.

4. (Original) The method as recited in claim 3, wherein said comparing step contemplates the use of the Hamming distance between the fingerprint bit and the media entity bit to determine the probability that said fingerprint and said media entity bits differ by Hamming distance according to the relation,

$$P(M) = e^{-(M-N/2)^2 / 2\sigma^2} / \sigma\sqrt{2\pi} ,$$

wherein  $\sigma$  is the standard deviation of the distribution expressed as,

$$\sigma = \sqrt{N/2} .$$

5. (Original) The method as recited in claim 4, further comprising the step of calculating the probability that the Hamming distance between two sequences of random bits is less than a value  $M'$  according to the relation,

$$P(M < M') = \int_0^{M'-1} e^{-(x-N/2)^2 / 2\sigma^2} / \sigma\sqrt{2\pi} dx .$$

6. (Currently Amended) The method as recited in claim 1 [[2]], wherein the average information density is taken to be the average entropy per processing frame of said media entities.

7. (Original) The method as recited in claim 6, wherein said average information density is determined by the relation,

$$S_{ave} = \frac{\sum_j S_j}{N}$$

wherein,  $N$  is the total number of processing frames.

8. (Original) The method as recited in claim 7, wherein  $S_j$  is determined by the relation,

$$S_j = -\sum_n b_n \log_2(b_n),$$

where  $b_n$  is the absolute value of the nth bin of the normalized real FFT of the processing frame.

9. (Original) The claim as recited in claim 8, where in the average standard deviation of the information density of said media entities is determined by the relation,

$$S_{std} = \frac{\sqrt{\sum_j (S_{ave} - S_j)^2}}{N}.$$

10. (Currently Amended) The method as recited in claim 1 [[2]], wherein the average critical band energy is determined by the relation,

$$\vec{C}_{ave} = \frac{\sum_j \vec{C}_j}{N}$$

wherein,  $\vec{C}_j$  is a vector of values consisting of the critical band energy in each critical band and N is the total number of processing frames.

11. (Currently Amended) The method as recited in claim 1 [[2]], wherein the average standard deviation of the critical band energy is determined by the relation,

$$C_{std} = \frac{\sqrt{\sum_j (C_{ave} - C_j)^2}}{N}$$

wherein, N is the total number of processing frames.

12. (Original) A computer readable medium bearing computer executable instructions for carrying out the method of claim 1.
13. (Original) A modulated data signal carrying computer executable instructions for carrying out the method of claim 1.
14. (Original) A computing device comprising means for carrying out each of the steps of the method of claim 1.
15. (Original) A system to create a fingerprint for media entities comprising:
  - a sampling system;
  - a processing system cooperating with said sampling system to generate said fingerprints, said processing system comprising means to calculate the information density of said media entities, standard deviation of the information density of said media entities, average critical band energy of said media entities, standard deviation of the critical band energy of said media entities, and the play-time of said media entities;
  - and
  - a communications interface, said communications interface cooperating with said processing system to communicate created fingerprints to participating users.
16. (Original) The system as recited in claim 15, wherein said sampling system prepares at least one sampling portion of said media entities for communication to said processing system.
17. (Original) The system as recited in claim 16, wherein said processing system cooperates with said sampling system to process said sampling portion when generating said fingerprint.

18. (Original) The system as recited in claim 15, wherein said processing system comprises a computing environment capable of performing said calculations.

19. (Original) The system as recited in claim 18, wherein said computing environment comprises any of a stand-alone or networked computing environments.

20. (Original) The system as recited in claim 15, wherein said communications interface comprises any of a fixed-wire LAN, a wireless LAN, a fixed-wire WAN, a wireless WAN, a fixed-wire extranet, a wireless extranet, a fixed-wire intranet, a wireless intranet, peer-to-peer computer network, the wireless Internet, and the fixed-wire Internet.

21. (Original) The system as recited in claim 15, wherein said processing system is a component of a media content analysis and distribution system.

22. (Original) A method to identify media entities using fingerprints, comprising the steps of:

- calculating a fingerprint in accordance with the steps of claim 1 of said media entities;

- comparing said calculated fingerprint to already calculated fingerprints found in a cooperating fingerprint data store; and

- evaluating the results of the comparison.

23. (Original) The method as recited in claim 22, further comprising the step of communicating the results of said evaluation step to participating users, said participating users comprising any of: cooperating media entity processing systems, end-users, regulatory agencies.



24. (Original) A method to authenticate media entities to ensure compliance with copyright regulations by employing fingerprints, comprising the steps of:  
calculating a fingerprint in accordance the steps of claim 1 of said media entities;  
comparing said calculated fingerprint to fingerprints of authorized media entities stored in a cooperating data store; and  
evaluating the results of the comparison to return a response indicative whether authorization was granted.

25. (Original) The method as recited in claim 24, further comprising the step of denying distribution access to media entities that are determined to be unauthorized.

26-30. Canceled.

**AMENDMENT TO THE SPECIFICATION**

Please delete the following paragraph beginning on page 1, line 3:

**--Disclaimer:**

~~The names of actual recording artist mentioned herein may be the trademarks of their respective owners. No association with any recording artist is intended or should be inferred.~~

Please replace the paragraph beginning on page 1, line 7 with the following rewritten paragraph:

**--Cross Reference to Related Application:**

This application is related to and claims priority under 35 U.S.C. § 119(e) to U.S. Provisional Patent Application Serial No. 60/224,841 filed August 11, 2000, entitled "AUDIO FINGERPRINTING", the contents of which are hereby incorporated by reference in their entirety. This application relates to U.S. Patent Ser. No. 09/900,230, filed July 6, 2001, U.S. Patent 6,545,209B1, issued April 8, 2003, U.S. Patent Ser. No. 09/934,071, filed August 20, 2001, U.S. Patent Ser. No. 09/900,059, filed July 6, 2001, U.S. Patent Ser. No. 09/934,774, filed August 21, 2001, U.S. Patent Ser. No. 09/935,349, filed August 21, 2001, U.S. Patent 6,657,117, issued December 2, 2003, U.S. Patent Ser. No. 09/904,465, filed July 13, 2001, U.S. Patent 6,748,395, issued June 8, 2004, and U.S. Patent Ser. No. 09/942,509, filed August 29, 2001~~Appln. Nos. (Attorney Docket Nos. MSFT-0577 through MSFT-0586).~~

**AMENDMENT TO THE ABSTRACT**

Please replace the Abstract with the following rewritten Abstract:

--A system and methods for the creation, management, and distribution of media entity fingerprinting are provided. In connection with a system that convergently merges perceptual and digital signal processing analysis of media entities for purposes of classifying the media entities, various means are provided to a user for automatically processing fingerprints for media entities for distribution to participating users. Techniques for providing efficient calculation and distribution of fingerprints for use in satisfying copyright regulations and in facilitating the association of meta data to media entities are included. In an illustrative implementation, the fingerprints may be generated and stored allowing for persistence of media from experience to experience. In various non-limiting embodiments, the processing of fingerprints includes calculating the average information density of the media entities, determining the standard deviation of the calculated information of the media entities, calculating the average critical band energy of the media entities, calculating the average standard deviation of the critical band energy of the media entities, determining the play-time of the media entities and processing the information density, the standard deviation of the information density, the critical band energy, the standard deviation of the critical band, and the play time to produce a bit-sequence representative of the fingerprint.--

### **REASONS FOR ALLOWANCE**

The following is an examiner's statement of reasons for allowance:

The present invention is directed to a system and method of fingerprinting media files. Each independent claim identifies the uniquely distinct features of 'processing the average information density, average standard deviation of the information density, average critical band energy, average standard deviation of the critical band energy and the play-time of said media to produce a bit-sequence representative of said fingerprint of said media entity'. The closest prior art, Ward et al. (US 2002/0133499 A1) and Blum et al. (US 5,918,223) disclose a system and method for acoustic fingerprinting wherein the fingerprint generation is influenced by a number of acoustic features but fails to disclose the use of a bit-sequence comprising information density, band energy, and play-time. Unlike these prior art systems, copying, trans-coding, or reformatting media entities will not adversely affect the present application's fingerprint. The prior art, either singularly or in combination, fail to anticipate or render the above underlined limitations obvious.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."


### CONCLUSION

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tamara Teslovich whose telephone number is (571) 272-4241. The examiner can normally be reached on Mon-Fri 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571) 272-3868. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

May 25, 2005  
T. Teslovich

  
ANDREW CALDWELL  
SUPERVISORY PATENT EXAMINER